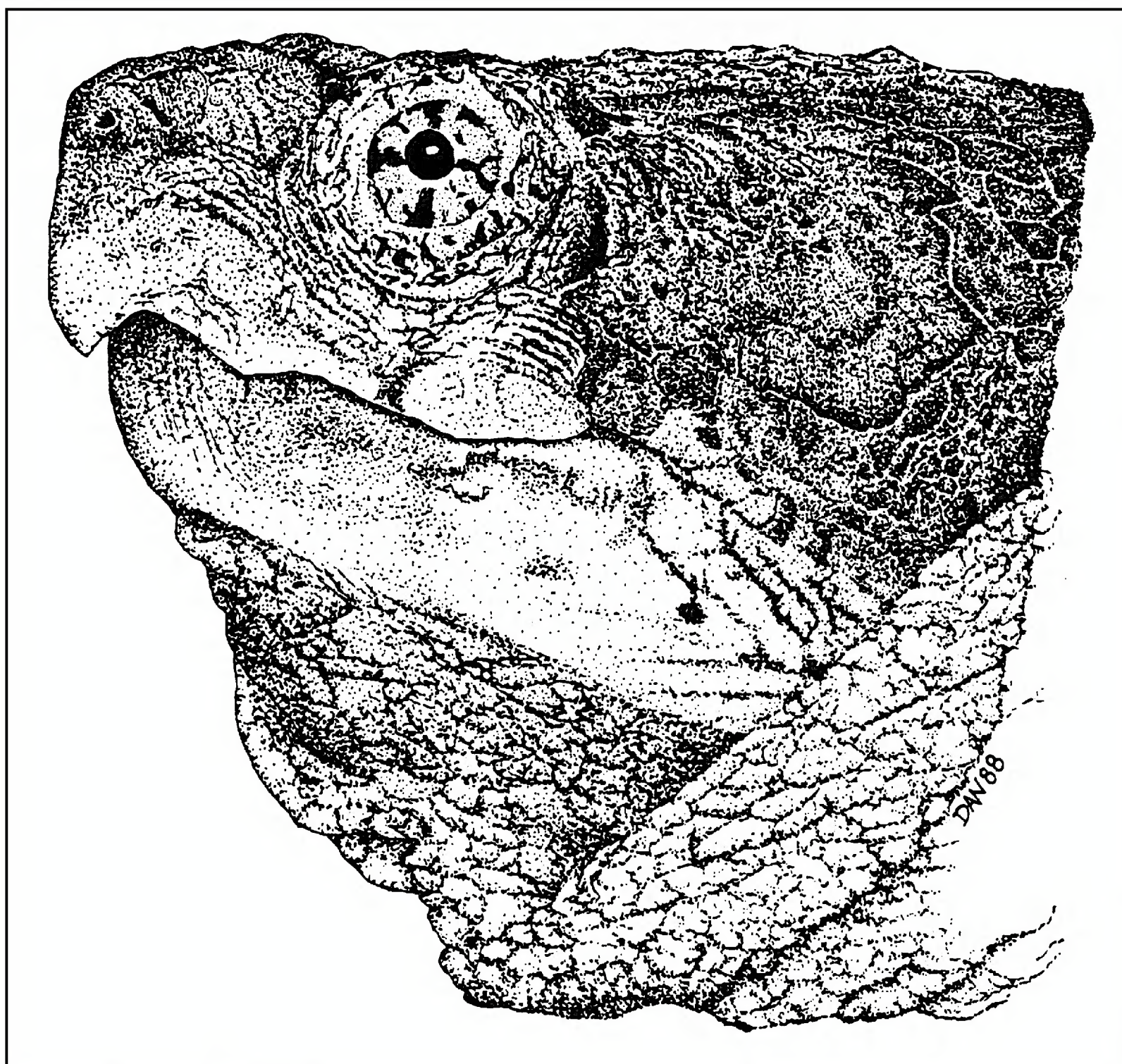

BULLETIN

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Volume 43, Number 12
December 2008



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**A Chelonian “Pear-able”:
Observations on Frugivory and Herbivory in Common Snapping Turtles
(Family Chelydridae: *Chelydra serpentina*)**

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Abstract

At a pond in Suffolk County, Virginia, adult *Chelydra* leave the pond in the evening and early morning during August and September to forage under a nearby pear tree for fallen pears. Most turtles hasten for the pond after securing a pear, preferring to eat them underwater. Other foraging turtles are apt to give chase if they notice that a compatriot has a pear. However, competition is probably also keen in the pond. Adult snappers congregate in the shallows along the north shore, either preparing to leave the pond in search of pears, or waiting for another turtle to return to the pond with one. One 30-cm specimen avoided possible competition by consuming pears where it found them. This specimen also ate a 10-cm piece of banana; thus it appears that predilection for fruit is probably general and not specific for pears. It appears that olfaction enables this dietary plasticity.

Key Words: *Chelydra serpentina*, common snapping turtle, diet, frugivory, herbivory, pears, bananas

Introduction

Common snapping turtles (*Chelydra serpentina*) are abundant in freshwater rivers, ponds, and brackish tidal streams throughout the coastal plain of southeastern Virginia (Dunson, 1986). Snapping turtles have long had a reputation as voracious predators, due in part to their widely known proclivity to seize ducklings and even adult ducks (Anatidae) (Alexander, 1943; Carr, 1952; Mahmoud and Klicka, 1979), a behavior to which even a popular children’s book alludes (McCloskey, 1941). During the first half of the twentieth century *Chelydra* was assumed, by fish and game managers (Alexander, 1943) and even herpetologists (Babcock, 1916), to be exclusively carnivorous, and more specifically, to be highly detrimental to waterfowl and game fish populations (Alexander, 1943). Subsequently both views have been shown to be incorrect.

The diet of *Chelydra* varies widely from one habitat type to another, reflecting the availability of different foods (Pell, 1940; Alexander, 1943). Pell (1940) reported that in one small, pebbly stream, three small *Chelydra* were feeding exclusively on crayfish, but in most habitats, snappers are confirmed omnivores. Beyond crayfish, prey include mollusks, crabs, shrimp, insects, fish, anurans (eggs, larvae, and adults), salamanders, snakes, other turtles, birds, and rarely even small mammals, such as moles or muskrats (Pell, 1940; Lagler, 1943; Alexander, 1943; Penn, 1950; Sorrell et al., 2006). *Chelydra* is also known to take carrion (Hatt, 1932; Pell, 1940).

Contrary to the opinion of Spotila and Bell (2008), that plant matter is ingested incidentally while consuming small invertebrates and vertebrates, in most locations, snapping turtles intentionally consume large amounts of plant material (Babcock, 1916; Pell, 1940; Alexander, 1943; Lagler, 1940; 1943; Budhabhatti and Moll, 1990). Spotila and Bell (2008), citing the work of Moll (1997) and Punzo (1975), suggested that snappers in the tropics may consume more vegetable material

than those at higher latitudes. However, Hammer (1972) in a study of the impact of *Chelydra* on waterfowl populations in a North Dakota marsh, found that plant matter comprised the bulk of the *Chelydra* diet in that decidedly non-tropical location.

Previously, in stomach content analyses of 18 *Chelydra* from New York and Massachusetts, Pell (1940) reported that plant matter was found in 61% of the stomachs, and that it comprised 53% of the bulk, although he cautioned that plant matter may remain in the gut longer than animal matter. Pell (1940) specifically identified filamentous algae, water lily leaves (*Nymphaea odorata*) and duckweed (*Lemna* sp.) from *Chelydra* digestive tracts. Lagler (1943) reported that there was little evidence that the snappers he studied in Michigan fed on terrestrial plants, but in Connecticut, Alexander (1943) reported that *Chelydra* stomachs contained algae, waterweed (*Elodea*), pondweed (*Potamogeton*), naiad (*Najas*), water lilies (*Nymphaea* and *Nuphar*), arrow arum (*Peltandra*) and skunk cabbage (*Symplocarpus*). The latter is terrestrial, although it grows in wet bottomlands. Ernst and Barbour (1972) report that *Chelydra* also consumes various wetland or aquatic plants, including duckweed (*Lemna*), water celery (*Vallisneria*), water meal (*Wolffia*), cattails (*Typha*), and knotweed (*Polygonum*). Other terrestrial plants were present in only trace quantities. Significantly, in his 1937 monograph on Illinois turtles, Cahn stated, “In spite of their preëminently carnivorous habits, occasional individuals are found whose stomach is full of grass, leaves, and other vegetable matter. Sometimes this represents aquatic vegetation, but more often terrestrial plants. In other words, when the turtle is out of water it cannot obtain its usual animal food, yet it is adaptive enough to subsist on a vegetable diet.” Cahn (1937) surmised that snappers eat vegetation when they cannot obtain their usual “animal food”; however, as the observations presented below will make clear, vegetable matter constitutes a primary food source, rather than sustenance of last resort.

Budhabhatti and Moll (1990) found approximately equal amounts of plant and animal matter in the diets of snapping turtles from a state park in Lake County, Illinois. Most turtles consumed only trace amounts of duckweed (*Lemna*), although in one individual, it comprised 92% of the fecal volume. Clearly individual preferences vary widely. It has been reported that feeding takes place underwater (Lagler, 1943; Ernst and Barbour, 1972); however, in the case of terrestrial plant matter, this rule sometimes holds, and sometimes not, as will be discussed hereafter.

Prologue

On 4 August 2008 neighbors reported that the previous night, while looking out their front window, they had noticed movement in the south yard of the neighbor across the street. Using binoculars, they were surprised to discover several snapping turtles out on the lawn, engaged in something akin to a rugby match. The snappers were foraging under a pear tree for fallen pears, which at that time, were few in number. Whenever a snapper found a pear and attempted to return to the pond with it, the others gave chase, attempting to steal it. During the rest of

August and September, I made periodic observations of *Chelydra* behavior relative to frugivory and herbivory.

The Pond and the Pear Tree

The snapping turtle population in question resides in a man-made freshwater pond of approximately 0.35 ha, located at 36°54'46.00"N and 76°29'03.72"W, in Suffolk County, Virginia (Figure 1). Water depths range from about 10 cm in the shallow west end to an original maximum depth of about 2.5 m shortly after the pond was created in approximately 1955. That was accomplished by damming a drainage into the salt marsh adjacent to Bleakhorn Creek, a tributary of the Nansemond River near its confluence with the James River (Figure 1).

An aged pear tree (~30 cm dbh), well scarred by sapsuckers, is located 14.5 m north of the pond and about 2 m above it, on a slight ridge that parallels the northern boundary of the pond (Figure 1). The tree is a feral hybrid, producing somewhat rounded pears that are neither standard Bartlett, nor Asian pears, though they tend toward the latter. These pears remain firm, softening only if cooked; thus squirrels and snapping turtles have little human competition at the time of pear harvest.



Figure 1. Aerial photo of pond, showing the man-made dam and the pond's proximity to the brackish Bleakhorn Creek, a tributary of the Nansemond River, Suffolk County, Virginia. The photo, taken 20 March 2006, with resolution equivalent to an altitude of 170 m, was obtained from Google Earth. Repairs to the dam after this photo was taken resulted in increased water depth and an extension of the western tip of the pond, to the level of the high water mark evident in this photo. The pear tree is indicated by an arrow. A crepe myrtle bush is just downhill toward the pond, and slightly to the east of the pear tree. One 20–22 cm specimen was observed making a loop from the pear tree, across the back of the hill eastward to the oak tree (right of the tail of the arrow), and then back to the pond beneath a pine tree. Photo credit: Google Earth.

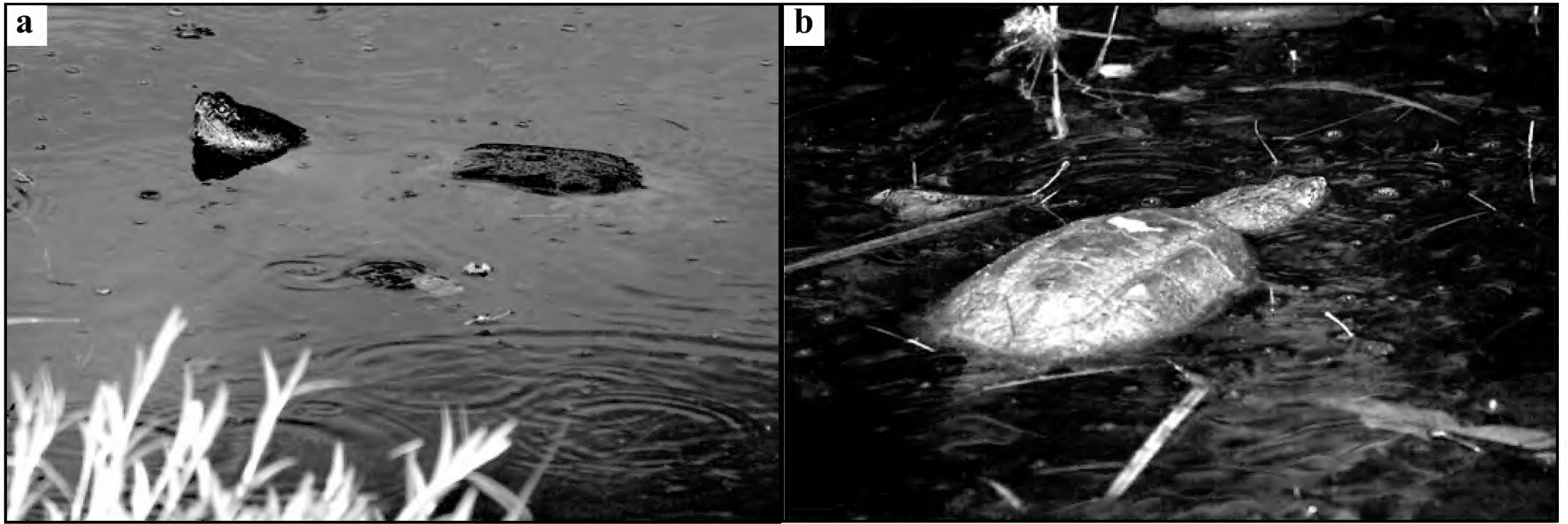


Figure 2. a). An adult snapper floats facing the north shore with its head and carapace out of the water. Occasionally other floating specimens were seen much farther out of the water than this one. This specimen was either deterred from leaving the pond, due to my presence, or was waiting for another snapper to return to the pond with a pear. b). An adult snapper grazing by neustophagia, or hunting minnows or small invertebrates in the west end of the pond just before dark.

4 August 2008—Preliminary observations

At about 1830 hr, a snapper with a carapace length of 20–22 cm was out on the lawn. Almost no pears were on the ground. I tossed a couple toward the turtle at close range, but perturbed by my approach, it went into a non-aggressive defensive posture and showed no interest in the pears.

Despite having walked around that pond many times during the last six years, I have never before seen a snapping turtle, although I knew they were present. On this occasion, however, *Chelydra* were gathered along the north edge of the pond in the vicinity of the pear tree, with as many as 4–8 large heads visible at all times. At any given moment, most were facing shoreward, and it was obvious that the hillside below the pear tree was the object of their attention. These snappers were behaving in a manner unlike anything I have previously witnessed. Many were floating after the manner of emydids, except that they were clearly less adept at it. Snappers, displaying unusual buoyancy, would periodically bob to the surface like corks, with their heads, upper carapaces, and even tail tips out of the water (Figure 2a). Unlike *Chrysemys picta*, which are also abundant in the pond, floating *Chelydra* appeared unstable, often rolling from side to side, as if they hadn't mastered surface swimming. Periodically in shallow water, one would see a tail tip jutting 8–12 cm out of and cutting a trace through the water, as its owner walked or swam unseen just below the surface.

Retiring to the rise along the south shore, I sat down to see whether any of the waiting turtles would emerge and ascend the hill. On that evening, no others did, but I observed one specimen of about 25 cm length repeatedly hauling halfway out onto the north bank to seize a particular species of plant. Each time the turtle would return to the water with the leafy stem protruding 10–15 cm from the side of its mouth. The plants were always eaten underwater. In each case, the plant selected was a species with linear leaves projecting at right angles from the stem. After carefully noting the location on the north shore, I collected some of the plant, which was afterward identified as *Eclipta prostrata* (Asteraceae). There was a narrow zone of 20–25 cm at certain places along the north bank that appeared to

have been largely denuded, though whether this was due to grazing by *Chelydra*, I cannot confirm. Other snappers were observed feeding at the surface in the shallow (10–15 cm) west end of the pond, in a manner similar to that described by Belkin and Gans (1968) and Budhabhatti and Moll (1990) (Figure 2b). They appeared to be taking in floating vegetation, although that portion of the pond is also very densely populated by small fish (3–6 cm). The turtles moved along slowly with the head slightly beneath or partly above and parallel to the surface. Food was taken with sudden lunges, and at times the jaws could be heard clomping shut. Turtles feeding in this fashion produced a lot of bubbles (Figure 2b).

6 August 2008, 1830 hrs—First photographs

After two nights of observation, I determined to photograph snappers returning to the pond with their prizes in beak. I set up the camera and tripod at the west end of the pond, 24 m west of the point where the turtles were wont to haul out of the pond. Then I retired to the slight rise above the south bank and sat down. From this vantage point, about 15 m from the north bank, I was able to see any turtles that began to emerge onto it.

After about 20 min, a small turtle (~20–22 cm carapace length) hauled out of the pond. Almost immediately, a larger specimen (~25 cm) followed. They began to ascend the hill in tandem, traveling about 2 m, before they both stopped, hunkered down in the grass, and sat motionless. After a minute or two, they extended their necks fully, looked around carefully, and then plodded up the hill another 3 m or so. Then they crouched again. This was followed by more cautious looking around, then another stealthy advance, followed by a third halt. Finally the larger turtle struck out ahead, located a pear near the base of the tree, and latched onto it. What followed was altogether comical.

Seeing that the turtle had its pear, I jumped up and ran for my camera. Instantly the turtle saw me, spun around, and with pear in mouth, charged for the pond. It is true that it was headed downhill, but I still had no idea that a snapping turtle could run like that. With tripod and camera in hand, I ran along the north

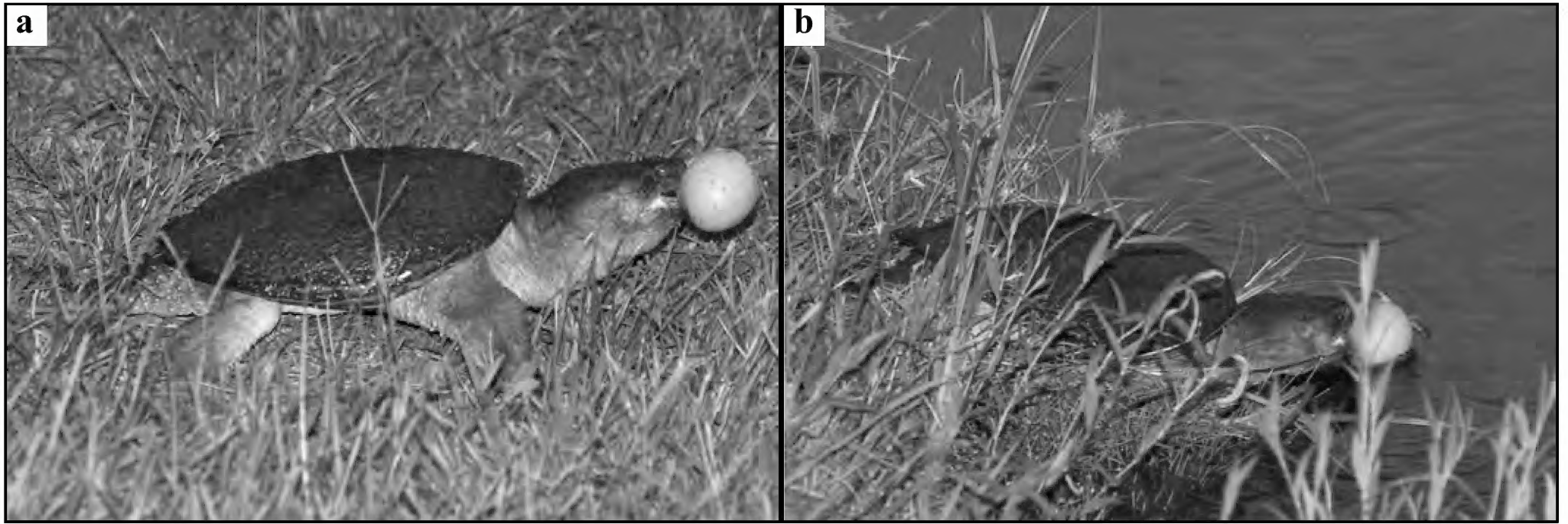


Figure 3. An adult *Chelydra*, pear in mouth, **a**). racing to the pond to devour its prize, and **b**). re-entering the pond.

shore of the pond trying to get into position before the snapper got to the pond. I did arrive first (I may be old, but I am still fleet of foot than a speeding snapping turtle . . . though not by much!). It was going so fast that I got off only three shots before it hit the water with a splash. The turtle had bolted the entire 14 m without slowing down! Later that evening, when I examined the photos, I found I had two chopped turtle shots and one of a carapace disappearing into the water.

That still left the smaller turtle, which I assumed was probably too traumatized by my sudden arrival, to continue its quest for a pear, but I decided to freeze next to my tripod and see what would happen. Eventually, to my delight, since I was already in position, the snapper proceeded toward the tree for a pear. As it turned out, this turtle was a novice pear hunter. Finding the forbidden fruit, it snapped gamely at a pear, which shot 30 cm uphill like a billiard ball. The turtle hotly pursued the runaway pear and snapped again. This time the pear was on bare dirt, and it rolled about 50 cm uphill. The chase continued for 20–30 seconds, in which time the snapper had chased the evasive pear about 2 m away from the pond! Finally the snapper lunged from the side, deflecting the pear back downhill. The intrepid pear connoisseur gave chase. Snap! Roll. Snap! Roll. I could hear a distinct, hollow clomp every time its jaws snapped shut. A couple of times the *Chelydra* paused to consider the matter before trying again to secure the wily pear, which it had now chased nearly 10 m altogether! Just as I was beginning to wonder if the amateur pear chaser was going to head butt the pear all the way to the pond thereby depriving me of the chance to photograph it actually carrying one, the turtle finally got a mouthful. Sensing that it had finally winged the fleet-footed pear, it paused with a piece of pear in its mouth. With mouth agape, the turtle was breathing heavily from the exertion, with the appetizer clearly visible inside. When the turtle finally snapped its jaws closed, it cut the piece cleanly in two. Then it turned its attention to the pear once again. After a few more unsuccessful snaps, the snapper finally sank its beak into the wounded pear and raised it high. The turtle then set off at a brisk pace, passing close by me on its way to the pond (Figure 3).

Several days later I observed a snapper of about 20–22 cm carapace length hunting for pears. On the north side of the pear tree when I first spotted it, the turtle moved along the north side of the crest of the hill until it reached the oak tree to the east,

where it turned south, passed under a pine tree, and returned to the pond. The total “pear-eggrination” was more than 55 m. While one might impugn the snapper’s intelligence by noting that pears don’t grow on oak trees, all squirrels observed leaving the pear tree with fruits, ran directly to that oak with them. It may be that turtles occasionally find partially eaten pears there.

4 September 2008—More observations on a cooperative *Chelydra*

At about 1900 hr while walking along Bleakhorn Road, west of the pond (Figure 1), my wife and I spotted a large *Chelydra* (~30 cm carapace length) about 8 m up the hill from the pond. We sat down with binoculars on the rise south of the pond, so as not to disturb the turtle. From that vantage point, there were no pears visible on the lawn. The turtle advanced toward tree in very short segments, hunkering down waiting and watching between advances, in the manner I had previously observed. When the turtle was perhaps 5 m from the tree, a squirrel approached the pear tree from the oak tree to the east (Figure 1). The squirrel immediately ascended the tree and harvested a pear. Descending to the lowest branch, about 1.6 m above the ground, the squirrel sat against the trunk and began to eat the pear. After several minutes, the turtle appeared to notice the movement and rapidly approached the tree about 60 cm. This seemed to unnerve the squirrel, which descended the tree in haste. Unseen by us, it dropped the pear several meters from the tree.

Ten to fifteen min later, the squirrel returned and began foraging on the ground under the pear tree and down the hill toward a crepe myrtle (Figure 1). Twice the squirrel approached within a couple meters of the turtle, which sprang to life and charged the squirrel for several steps. While the snapper’s intent was unclear, I believe it thought the squirrel might have a pear and was hoping that the surprised squirrel might drop it. That would seem more likely than surmising that the turtle thought it could catch a squirrel for dinner.

As the twilight deepened, it appeared that turtle might return to pond “pearless.” Assuming that there would be no fruitful observations that night, I wanted my wife to see her first *Chelydra* at close range. As we rounded the west edge of the pond, I had her walk along the pond edge to cut off the snapper’s re-

treat. She approached no closer than 4–5 m, while I circled around behind the tree in an attempt to find some fallen pears. I located a couple, including the gnawed pear dropped by the squirrel. These I rolled toward the turtle, but on hard ground and traveling downhill, they rolled past the turtle, all the way to my wife. She picked them up, advanced a meter or two toward the turtle and in full view of the turtle, rolled them uphill toward it. I was convinced, from my previous attempt to do this with slightly smaller turtle, that the snapper would be put off by her proximity and would assume a defensive posture to wait us out, but I was wrong!

My wife's first bowled pear went wide to the left and the *Chelydra* appeared oblivious to it. The second pear bounced off the right front corner of its carapace and rolled downhill about 60 cm. The snapper sprang to action and pursued it with alacrity, utterly unperturbed by our presence. It twice bit at the hard pear unsuccessfully, causing it to roll away downhill each time, but secured the pear on the third bite. To my surprise, the turtle proceeded to devour the pear during the next 15–20 min. The snapper consumed the entire pear without returning to water! At times it would pause with mouth open, full of pear. The turtle seemed to have difficulty swallowing the fruit, but finally succeeded. Then it sauntered casually back to the pond, walking right past my wife.

On 7 September 2008, a large *Chelydra* of probably at least 30 cm carapace length was observed up on the lawn at 0845 hrs, confirming that snappers also forage for pears in the morning as well as in the evening, consistent with the report of Smith and Iverson (2004) that *Chelydra* is crepuscular.

15 September 2008—Fruitful experiment

As we set out on an evening walk at 1910 hr, from Bleakhorn Road we observed six *Chelydra* in the neighbor's yard. My wife suggested that I return and get my camera. On our way back to the house she further suggested that we pick some tomatoes from the garden and also take some bananas back with us. I doubted that the *Chelydra* would be interested in tomatoes (unlike *Terrapene*), but then, thinking that this might be an interesting experiment to test the plasticity of *Chelydra* food preferences, I concurred.

Five turtles were underneath the pear tree scouting for fallen pears, although there were none. The sixth turtle was some 3–4 m from the edge of the pond. As we approached, the latter spotted us while we were some 35 m distant, whirled, and charged for the pond at full speed. The remaining five, apparently sensing that they were too far from the pond to make a run for it, decided to wait it out. The four smaller turtles pulled at least partially into their shells, in a semi-defensive posture. The largest seemed relatively unabashed by our presence, but stopped foraging. We were quite certain that this was the same individual that had eaten an entire pear previously before returning to the pond.

Without approaching more closely than 4 m I tossed tomatoes and 10 cm pieces of banana (peeled) to several of the closer turtles, but did not manage to provoke a response from any. I could not be certain if this were because lawn bowling with

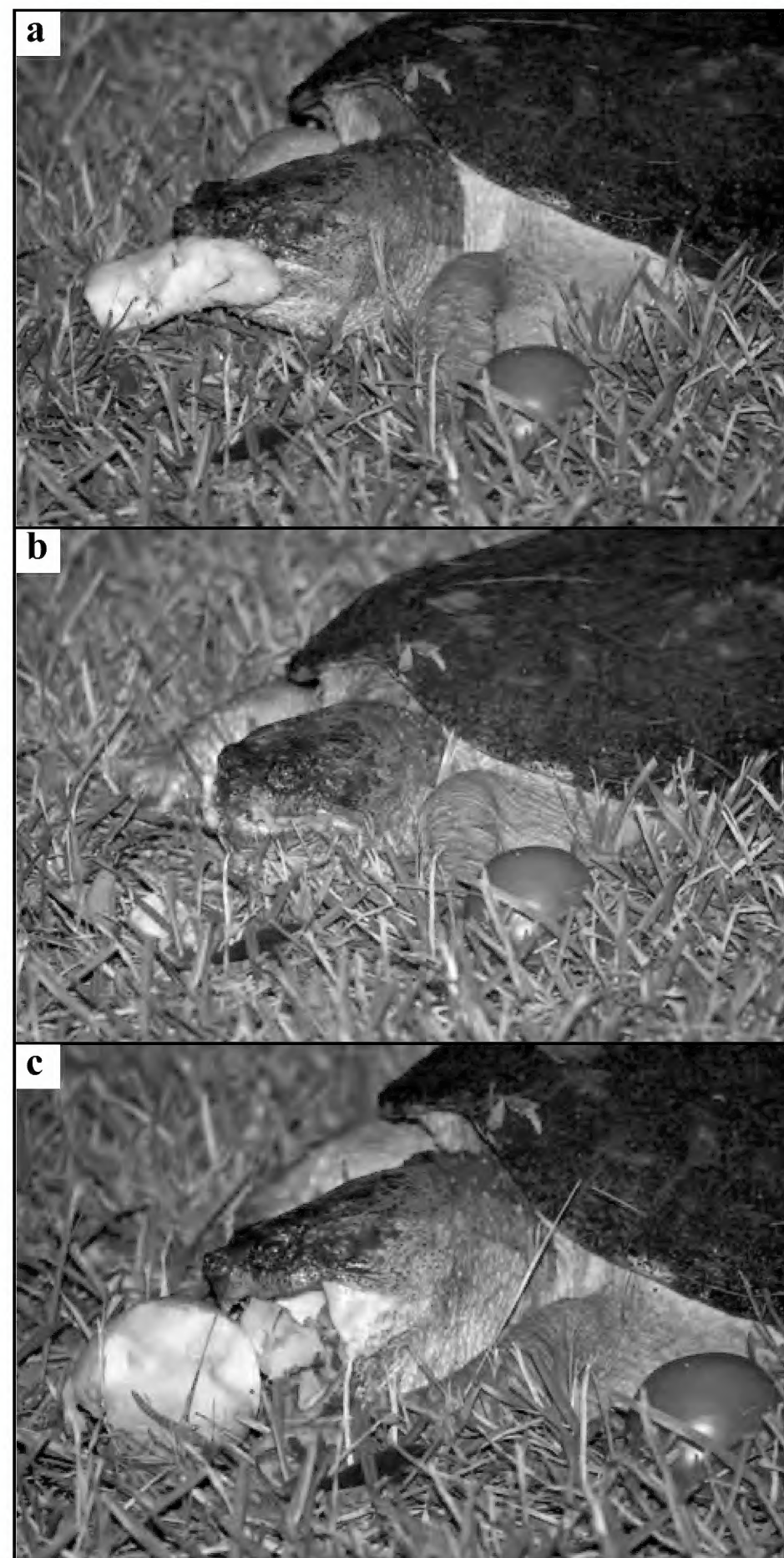


Figure 4. Age and wisdom trump youth and impetuosity. An older and wiser *Chelydra* avoided competition in the pond by consuming fruits where it encountered them. **a**). After an initial bite of pear, a 10-cm piece of banana was retrieved, and finished **b**). before returning to the pear **c**). The tomato was left untouched.

fruits has a low success rate, or whether the turtles were simply daunted by our presence. However, a near miss left one snapper with a chunk of banana stuck to its face. Finally I decided to risk intimidating the 30-cm specimen by approaching it more closely. By getting within 2 m, I succeeded in pitching a tomato and a piece of banana within 15 cm of its head. As soon as I retreated to about 6–7 m, the animal immediately extended its neck and carefully planted its nose on the banana for about 30 sec. However, it declined to eat the unfamiliar fruit.

After all interest in the banana subsided and the turtle retracted its neck, I decided to expand the experiment by retrieving a pear from the tree and offering it to this same turtle, to see if it would eat a pear under the same circumstances in which it had rejected the other two fruits (Figure 4). The rolled pear

actually bounced off the turtle's nose and came to rest a short distance away. As previously, this turtle immediately charged after the pear. Furthermore, it began eating and swallowing the fruit in place, suggesting that it was the same specimen observed on 4 September. However, after eating several pieces of pear, the *Chelydra* clipped the pear, causing it to roll perhaps 30 cm. After pausing to consider this further, the turtle turned and retrieved the piece of banana instead, and proceeded to eat that (Figure 4). At one point, it bit the banana in the middle leaving 1–1.5 cm of banana stuck to each side of its face. It seemed a laborious process to swallow the main piece of banana stuck inside its mouth, but as soon as it finished the banana, the turtle turned its attention back to the pear, the location of which it clearly knew. By this time it was nearly dark, and the tomato was still untouched. The next morning that tomato remained, but all pieces of banana, all pears, and the other tomatoes were gone from all locations where I had tossed them. Because the neighborhood is home to large numbers of gray foxes, raccoons, and squirrels, with lesser numbers of opossums, it cannot not be concluded that they were eaten by *Chelydra*, although that is possible.

18 September, 2008—A final observation

At about 1830 hr a large snapper was observed out on the lawn approaching the only fallen pear that was visible. Seizing the pear, the turtle immediately set off for the pond at a chelonian gallop. The temperature was about 23°C. For all previous observations, it had been 28–30°C. We were approximately 60 m from the turtle, and it is not clear whether the turtle was in a hurry because it was aware of our presence, or simply because it had completed its quest and was anxious to return to the safety of the pond.

Additional questions

How did this chelydrid craving for pears, bananas, and presumably other fruits, originate? Perhaps it grew out of an association with paw paws (Annonaceae: *Asimina* sp), and other fruits that grow in proximity to bodies of water. There are about eight species of *Asimina* native to the southeastern U.S., although *Asimina triloba* ranges as far north as New York and southern Ontario. Both *Asimina triloba* and *Asimina parviflora* occur as far west as eastern Texas. The large, white- or yellow-fleshed fruits may weigh up to 500 g and have flavors resembling banana or mango, hence some of the common names such as American custard apple or Indiana banana. Persimmons (Ebenaceae: *Diospyros virginiana*) may be another possible food source in the southeastern United States, since immature fruits drop all summer. In the tropics, other species are probably eaten.

How do the snappers know that the pears are there? Do they just begin foraging overland at about the time that the first fruits ripen, or do they specifically detect them? That latter seems more likely, and given the behavior of the large *Chelydra* presented with a piece of banana, the most likely explanation is olfaction. If *Chelydra* are able to detect common fruit esters with high sensitivity, this may explain how they locate fallen, ripe fruits of many types. On 6 October, with temperature at

about 24°C, and no pears left in the tree, no *Chelydra* could be observed anywhere along the north shore or in the west end of the pond. They clearly knew that the harvest was over, even though temperatures were still warm.

How do they know that pears are edible? Food imprinting has been reported in juvenile snappers (Burghardt and Hess, 1966). Nonetheless, the observed frugivory, and especially the willingness to eat bananas, suggests more dietary plasticity than has heretofore been assumed. Again, if *Chelydra* are able to detect common fruit esters, this may enable them to recognize novel foods as edible.

Did the large *Chelydra* choose to eat the banana, or did it mistake the banana for an uneaten piece of pear? This turtle ate the 10-cm piece of banana, which was closer to it than the pear that had rolled away. When the banana was gone, the turtle immediately set off after the pear, the location of which it was clearly aware. Again, if the turtles detect certain common fruit esters, this might explain the willingness to experiment with new fruits that produce those same aromatic compounds. Conant (1938) recorded that captive *Chelydra* ate lettuce and an apple core that fell into the tank. More recently, Palmer and Braswell (1995) reported, "An adult snapper, from Johnston County, [North Carolina] contained several small mussels, gastropod shells, crayfish parts, and about two dozen muscadine grapes (*Vitis rotundifolia*). Another from that county had eaten about 80 muscadine grapes, and a third had consumed more than 100 of these grapes. A Granville County adult contained the remains of a juvenile common musk turtle, and the intestine of another from that county contained 538 grams of corn and corn cob."

Why do only adult *Chelydra* leave the pond to search overland for fruit? It may be that only adult *Chelydra* are at relatively low risk of predation; hence, except for hatchlings migrating from the nest to water, perhaps juveniles and subadults do not normally travel overland. Even so, the large adults observed ascending the hill toward the pear tree, did so in a decidedly cautious manner.

Since feeding normally takes place underwater (Lagler, 1943; Ernst and Barbour, 1972), what induced this one specimen to modify its behavior? That is, why didn't this large *Chelydra* grab a pear and run for the pond like its compatriots? I am convinced that the behavior of this animal shows evidence of reasoning ability that I would formerly have been disinclined to attribute to a turtle. Of the 6–10 *Chelydra* observed foraging for pears, this one animal was a behavioral standout in several regards. It was the only turtle that did not seem greatly perturbed by our presence. When approached it did not hunker down as most of the others did. It responded immediately to pears tossed to it, and it did not cease eating when I approached to within 2–3 m to take photographs. When this animal headed back to the pond, it was the only one that was not in a hurry. Given the number of snappers waiting along the shore, it is tempting to conclude that this turtle settled on this strategy to avoid competition in the pond for hard-won pears.

Chelydra serpentina is certainly one of the best known North American turtles, but how little we really know about it!

Acknowledgments

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Literature Cited

- Alexander, M. M. 1943. Food habits of the snapping turtle in Connecticut. *Journal of Wildlife Management* 7(3):278-282.
- Babcock, H. L. 1916. Notes on an unusual habit of the snapping turtle, *Chelydra serpentina* (Linn.). *Copeia* (37):89-90.
- Belkin, D. A., and C. Gans. 1968. An unusual chelonian feeding niche. *Ecology* 49:768-769.
- Budhabhatti, J., and E. O. Moll. 1990. *Chelydra serpentina* (common snapping turtle). Feeding behavior. *Herpetological Review* 21(1):19.
- Burghardt, G. M., and E. H. Hess. 1966. Food imprinting in the snapping turtle, *Chelydra serpentina*. *Science* 151:108-109.
- Cahn, A. R. 1937. The Turtles of Illinois. Illinois Biological Monographs 16(1-2):1-218. [p. 44]
- Carr, A. 1952, Handbook of turtles: Turtles of the United States, Canada, and Baja California. Ithaca, New York: Cornell University Press. [pp. 67-68]
- Conant, R.. 1938. The reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.. [p. 127]
- Dunson, W. A. 1986. Estuarine populations of the snapping turtle (*Chelydra*) as a model for the evolution of marine adaptations in reptiles. *Copeia* 1986(3):741-756.
- Ernst, C. H., and R. W. Barbour. 1972. Turtles of the United States.. Lexington: The University Press of Kentucky. [pp. 24-25]
- Hammer, D. 1972. Ecological relations of waterfowl and snapping turtle populations. Ph.D. dissertation, Utah State University, Logan.
- Hatt, R. T. 1932. Turtles eat heron. *Copeia* 1932(1):37.
- Lagler, K. F. 1943. Food habits and economic relations of the turtles of Michigan with special reference to fish management. *American Midland Naturalist* 29:257-312.
- Mahmoud, I. Y., and J. Klicka. 1979. Feeding, drinking, and excretion. Pp. 229-243. In: M. Harless and H. Morlock, editors, *Turtles: perspectives and research*. New York: John Wiley and Sons.
- McCloskey, R. 1941. Make way for ducklings. New York: The Viking Press.
- Moll, D. 1997. Ecological characteristics of the Snapping Turtle, *Chelydra serpentina acutirostris*, in Costa Rica. P. 145. In: Z. Roëek and S. Hart, editors, *Herpetology '97: Abstracts of the Third World Congress of Herpetology, 2–10 August 1997, Prague, Czech Republic*.
- Palmer, W. M., and A. L. Braswell. 1995. Reptiles of North Carolina. Chapel Hill and London: The University of North Carolina Press. [p. 40]
- Pell, S. M. 1940. Notes on the food habits of the common snapping turtle. *Copeia* 1940(2):131.
- Penn, G. H. 1950. Utilization of crawfishes by cold-blooded vertebrates in the eastern United States. *American Midland Naturalist* 44:643-658.
- Punzo, F. 1975. Studies on the feeding behavior, diet, nesting habits and temperature relationships of *Chelydra serpentina osceola* (Chelonia: Chelydridae). *J. Herpetology* 9(2):207-210.
- Sloan, K. N., K. A. Buhlmann and J. E. Lovich. 1996. Stomach contents of commercially harvested adult alligator snapping turtles, *Macrocllemys temminckii*. *Chelonian Conservation and Biology* 2(1):96-99.
- Smith, G. R., and J. B. Iverson. 2004. Diel activity patterns of the turtle assemblage of a northern Indiana lake. *American Midland Naturalist* 152:156-164.
- Sorrell, G. G., S. K.Hoss and M. M. Gangloff. 2006. *Chelydra serpentina* (common snapping turtle). Diet. *Herpetological Review* 37(4):455.
- Spotila, J. R., and B. A. Bell. 2008. Thermal ecology and feeding of the snapping turtle, *Chelydra serpentina*. Pp. 71-79. In: A. C. Steyermark, M. S. Finkler and J. R. Brooks, editors, *Biology of the snapping turtle (Chelydra serpentina)*. Baltimore: Johns Hopkins Press.

**Book Review: *Mean and Lowly Things: Snakes, Science and Survival in the Congo* by Kate Jackson
2008. 328 pp. Harvard University Press. ISBN-13: 978-0-674-02974-3. Hardcover. \$27.95**

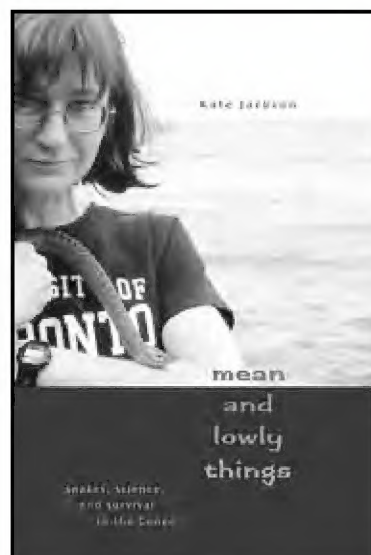
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Kate Jackson's introduction to fieldwork in the Republic of Congo is less than welcoming. War breaks out on the fourth day of her first collecting expedition there, and within a month her trip ends with a medical evacuation for a limb-threatening infection. But even on her trip back to the USA, Jackson vows to return to resume her fieldwork.

Fast forward seven years. Jackson has finished her graduate work at Harvard and a post-doc before venturing back to the Republic of Congo. This is not to be confused with the larger, more stable, Democratic Republic of Congo, which was formerly the Belgian Congo. Jackson will conduct her field studies in the northern third of the country, part of the enormous forest of the Congo River drainage basin.

Dr. Jackson paints an accurate picture of what is involved in trying to get an expedition organized in a rather young country such as Republic of Congo. Money is among the least of your worries. What's emphasized in the book (and rightly so!) is the importance of local contacts. Such contacts are important not only for field help, but for assistance in negotiating the various permits and payments necessary to be able not only to collect specimens but to be able to get them transported back to a museum in the USA. Another complication is the attainment of a visa into the country and the rather ingenious solution that the Congolese embassy official devises to correct a "wrong" date on a visa that is written in black ink. He simply instructs Jackson to use a black pen to change the number from a "1" to a "2." Further bureaucratic troubles await Jackson in Brazzaville, the capital of Republic of Congo, as she attempts to obtain the fourth and final permit that she'll need to work within the Wildlife Conservation Society's Lac Télé Reserve. Jackson and her local contact make several trips to the office where she is to obtain the permit, including a very frustrating visit on the morning of her departure into the field, but to no avail. The best that can be done is for her local contact to pick up the permit the following week, scan it, and email it to the Reserve office so that Jackson can start her work right away. Though this recounted incident occurred in 2006, it might just as well have been 20 years ago. I experienced very similar situations when traveling through countries in sub-Saharan Africa in 1985 with an international group of travelers. I guess some things change s-l-o-w-l-y.

Jackson does eventually find her way to the Reserve and do a bit of collecting though she is forced to spend a lot of time and energy in getting a camp set up, trying to minimize daily intru-



sions from the local community, and managing her meager field crew. It may be surprising to some readers to learn of how terrified many of the local people are of creatures living in their area and the associated difficulties Jackson has in obtaining reliable field help. An interesting observation is the fact that many of the local inhabitants share the same perceptions regarding snakes as do individuals that I have interviewed and surveyed in the USA. Jackson suggests that many local inhabitants believe that many harmless snakes are actually venomous, and thus kill these creatures. We often observe this same behavior locally, whereby individuals kill foxsnakes, milksnakes, and hog-nosed snakes because of a mistaken belief that they're venomous.

After her first full field season, Jackson returns to Toronto and makes a commitment to learn Lingala, the local language spoken at her field site. She tries to find pre-packaged software or a book, but is unsuccessful and turns to the Embassy of the Democratic Republic of Congo in Washington, D.C., for help. It turns out that the person who answers the phone has a nephew, Delphin, who has recently moved to Toronto and speaks Lingala. Not only does Jackson gain a tutor, she gains a soul mate in the process.

During her second field season in Republic of Congo, Jackson trains two in-country students, Lise and Ange, in herpetological field methods as a means of building local herpetological capacity. Her students prove to be a delight in some respects and rather challenging in others. The intrusion of Lise's modern music into the field camp and Jackson's inability to escape from it leads to some feelings of frustration, as do Lise's fears of water and of handling live snakes. In the end though, Jackson's students rise to the challenges and prove themselves to be competent field herpetologists.

I really enjoyed reading of Dr. Jackson's adventures in Africa, and believe this book would be a great addition to any snake-enthusiast's or field herpetologist's library. This would be a great gift for students who aspire to travel to far-off lands to conduct field studies in herpetology, or any other field biology studies for that matter. It paints an accurate picture of not only the rewards of working in such areas, but also the real challenges that one faces in doing so. There are real limitations as to what one can collect, how much of what one collects can successfully be preserved and transported back to a collection, and the amount of actual fieldwork that can be accomplished given the cultural differences and regulatory processes that must be accommodated.

Mean and Lowly Things provides a great adventure for the armchair traveler, and may even inspire one to move from the armchair and into the driver's seat or airline seat for one's own field adventures.

What You Missed at the November CHS Meeting

John Archer

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(all photos by Mike Redmer)

It's no accident that all of our speakers are great. It's mostly due to the hard work of our vice-president Jason Hood. The vice-president is the board member who normally arranges the speakers. Of course, that's with help from those of you who see or hear someone you particularly like, and suggest that person's name to Jason. Everybody on the CHS board contributes to the success of this organization, and the board deserves thanks every now and then. I'm going to take this opportunity to thank our outgoing board members: Nancy Kloskowski, Matt O'Connor and Amy Sullivan. All contributed their individual talents to the CHS this year, often doing double duties and completing jobs that no one else wanted. People such as these are integral to any organization, and we appreciate their efforts. Thank you. With luck (ours, maybe not yours) we'll see you on the board again.

And congratulations and thank-you to the new board members elected at November's meeting. We appreciate your willingness to serve and look forward to a productive 2009 with you on the board. Aaron LaForge will serve as publications secretary, and Rick Hoppenrath and Brad Trost will be new members-at-large. The rest of the board members are:

President: John Archer

Vice-president: Jason Hood

Treasurer: Andy Malawy

Recording Secretary: Cindy Rampacek

Membership Secretary: Mike Dloogatch

Sergeant-at-arms: Dan Bavrisha

Corresponding Secretary: Deb Krohn

Members-at-large: Jenny Vollman and Linda Malawy

Thank-you again to all new and returning board members. This kind of talent will keep the Chicago Herpetological Society the quality organization it has become, but can't we do something about that president?

Josh the Raffle Man once again did an outstanding job of speeding up the raffle and Rick Hoppenrath was superior at running the elections. I fantasize about having a hotly contested election sometime, but alas, it was not to be this year. All positions were unchallenged, and the new board will start in January.

We hurried through the business part of the meeting because of the election and because we had Mike Redmer speaking to us. Mike has been a member of the CHS for a long time. In the past he's worked for the Forest Preserve District of DuPage County and the Illinois Department of Natural Resources, and he's currently a wildlife biologist for the Chicago field office of the U.S. Fish and Wildlife Service. He is on the advisory board for Midwest Partners for Amphibian and Reptile Conservation (PARC) and is lead biologist on the eastern massasauga for the U.S. Fish and Wildlife Service. He's also a professional wildlife photographer and lectures widely on a number of different herp and non-herp related topics. Not too long ago he enthralled us with the telling of his travels to Panama. So the first thing he does is apologize. Mike really wanted to give a presentation to

the society, and he apologized for putting together this one at the last minute. As expected by anyone who has heard him speak, no apology was needed for the fully professional program he claimed to throw together at the last minute. Illustrated by his terrific photographs and clarified by well-constructed graphics, Mike spoke on the state of herp conservation in Illinois.

He first read to us Webster's definition for conservation: "A careful preservation of something; especially; planned management of a natural resource to prevent exploitation, destruction, or neglect." Mike adds, "and ensure their sustainability." He then took us through a short history of government conservation of species, which began with the federal Endangered Species Act of 1973, took us through the definitions of "Endangered" and "Threatened," pointed out that there is no difference in the way each is treated, and put on the screen the definition of Take: "to harass, pursue, hunt, shoot, wound, trap, kill, capture, or collect." Please note that "taking" of a listed species is prohibited and that the definition is very encompassing.

He moved on to Illinois and our state's treatment of endangered species.

1) All federally listed species are also protected by state law, plus . . .

2) Such other species . . . in danger of [or threatened with] extinction in the wild in Illinois, as determined by the Illinois Endangered Species Protection Board.

3) Illinois Department of Natural Resources is the primary agency responsible for enforcement.

The law establishes an endangered species protection board that advises the governor on threatened or endangered species (T/E species). This nine-member board is appointed by the governor and must be made up of state-expert biologists. These board members are aided by experts on specific taxa, constituting "Endangered Species Technical Advisory Committees" or



The broad-banded watersnake (*Nerodia fasciata confluens*) is probably extirpated in Illinois. One hasn't been seen and documented in the state since the late 1950s.



The western hog-nosed snake (*Heterodon nasicus*) is a habitat specialist, dwelling mostly in sand prairies. Its small disjunct populations make it particularly susceptible to habitat loss and illegal collecting. As with most herps, roads take a toll.

ESTACs. Mike sits on the Herp ESTAC. Every five years these boards are obligated to review the state's listed T/E species and make recommendations for changes.

After presenting the legal situation, Mike moved to an overview of the herps in Illinois. He noted that Illinois has a diverse population of herps, mainly due to its roughly 400-mile-long north-south axis, but also because its central position allows intrusions of several biomes from the surrounding areas. We have 103 species of herps native to Illinois. Twenty-seven of those are listed as T/E species or soon will be. That's why Mike wanted to talk to the CHS. He had a slide that showed the distribution of Illinois herp taxa:

Frogs and toads: 22

Salamanders: 20

Turtles: 17

Lizards: 6 (in addition, reproducing populations are known for two introduced lizard species)

Snakes: 38

And the distribution of the T/E species:

Frogs and toads: 3/22

Salamanders: 6/20

Turtles: 7/17

Lizards: 0/6

Snakes: 11/38

Then, using tables and pictures, Mike reviewed a sampling of some of the T/E species and their problems.

Four-toed salamanders (*Hemidactylium scutatum*) are, like many of the T/E species, habitat specialists. They need cool groundwater seeps in wooded areas that have extensive moss, a habitat that has always been fragmented in the state, but is becoming increasingly so because of roads and development. They have a low reproductive potential, laying comparatively few eggs and going through a life cycle that perhaps exposes the larvae to more predation than other salamanders. Many of these same threats are factors in the listing of other species, so Mike made charts for each T/E species and checked which factors affected each species' possible extinction in the wild. He listed "small range," "habitat specialist" and "population biology" as

"constraints" caused by the animals' biology, and "habitat loss," "roads," "collecting," and "harvesting, persecution and pollution" as external and frequently human-caused "threats." No animal had all the boxes checked, but several had all but one checked and none had fewer than three checked. All of these animals are under assault from a variety of threats and are hampered by various unique biological functions.

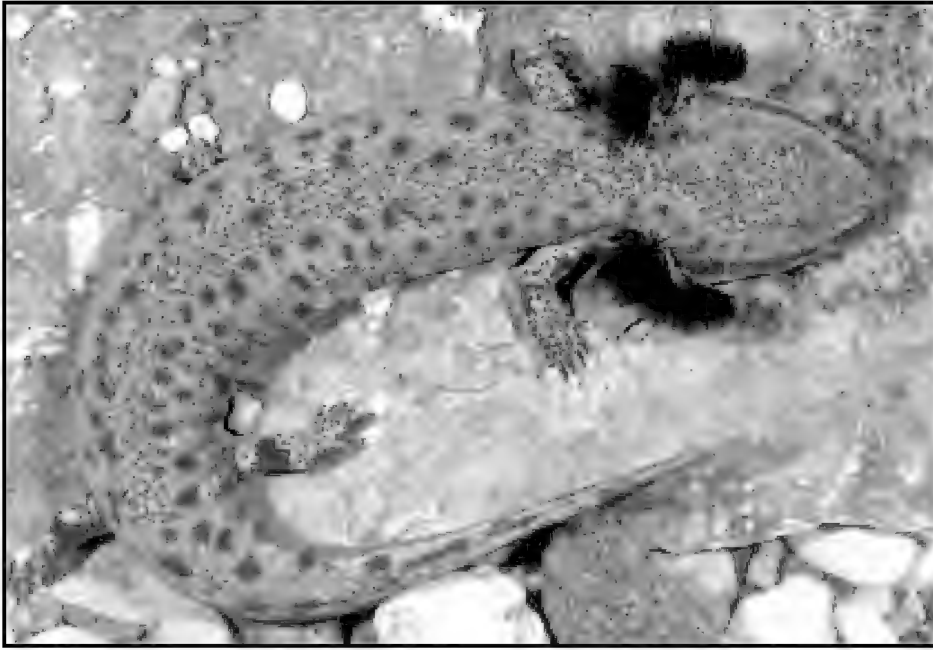
The dusky salamander (*Desmognathus conanti*) is another salamander with a fragmented range. It requires spring-fed streams in wooded habitats. No obvious reproductive factors jeopardize this animal, but with a small and fragmented range in Illinois (only 12 known localities), this salamander is exposed to the threat of pollution destroying entire populations. Mike also offered an example of a salamander doing fine in spite of having a fragmented habitat and a small range. Concentrated in heavily populated NE Illinois, the blue-spotted salamander (*Ambystoma laterale*) seems to be doing well in woodland habitat, and while there has been habitat loss, most of that animal's habitat is now protected. Things are never simple in biology.

Mike highlighted the eastern narrowmouth toad (*Gastrophryne carolinensis*) as one of the threatened frogs. This anuran's small range is within thirty-five miles of downtown St. Louis, and is under pressure from development and road traffic. After rain events, one can find hundreds killed on the roads, and increasing traffic with spreading development has put these frogs under tremendous pressure in Illinois.

Of all the taxa, Illinois turtles are most at risk. Forty-nine percent of the species in Illinois fall into the T/E species category. Certainly one of the biggest constraints on turtles is their slow reproductive potential, but many have disjunct ranges and require shallow, wet lowlands. Once drained, such wetlands become prime farmland, and habitat loss is extensive. Unfortunately, turtles like the Illinois mud turtle (*Kinosternon flavescens*) and Blanding's turtle (*Emys* [= *Emydoidea*] *blandingii*) are subject to illegal collecting. Some populations of Blanding's turtles are probably what Mike calls zombie populations—made up of long-lived adults that are not producing enough young to sustain themselves.

Under snakes, Mike talked about the massasauga rattlesnake (*Sistrurus catenatus*). Illinois, Indiana and Iowa are probably in a race to see which of these states will be the first to lose its massasaugas, and they're already extinct in Minnesota. These animals like open, grassy, wet fields with a few scattered shrubs, a habitat that is frequently invaded by aggressive woody plants. Prescribed burns are effective in keeping the overgrowth from becoming too dense, but prescribed burns frequently kill these little snakes. Seasonal timing is critical if these burns are not to do more harm than good to the snakes. Timber rattlers are also protected in Illinois, and are subject to most of the same hazards that menace the massasaugas. Of course, rattlesnakes are always subject to persecution as the uninformed readily kill them.

Next year will probably see the smooth softshell turtle (*Apalone mutica*), the ornate box turtle (*Terrapene ornata*), and the mudpuppy (*Necturus maculosus*) added to the list of protected animals in Illinois. Wait a minute, the mudpuppy? Mike admitted that this salamander is still doing well in Lake Michigan and



Mike said that mudpuppies (*Necturus maculosus*) will be listed as state threatened sometime in 2009. While there are still good populations in Lake Michigan and Wolf Lake, the rivers and streams where the mudpuppy was formerly found are being silted up and few are being found where they have been historically reported. Mudpuppies in moving water need clear water and gravelly bottoms. If you have these in captivity, you'll need a permit.

Wolf Lake, but when this animal lives in streams it needs clear water and gravelly bottoms. Many of its historic locations in Illinois waterways are becoming silted over because of agriculture runoff. Coupled with the mudpuppy's long maturation rate, that threat means they are no longer found in much of their former range. Mike knows that many of our members have some of these animals in captivity, and suggested that we begin the permit process before the animals become officially listed.

You can write to the following for your applications:

Endangered Species Program Manager
Division of Natural Heritage
Illinois Department of Natural Resources
 524 S. Second Street
 Springfield, IL 62701-1787.

The act can be viewed here:

<http://www.dnr.state.il.us/conservation/naturalheritage/end-spec/html1070.htm>

And this is the link to the Illinois Endangered Species Protection Board web site:

<http://www.dnr.state.il.us/espb/index.htm>

The eastern hognose (*Heterodon platirhinos*) and smooth greensnake (*Opheodrys vernalis*) will probably be joining the list in the not too distant future, as these animals are no longer found over much of their historic range. Mike stressed the fact that the Herp ESTAC makes its decisions based on the best scientific data available, and even though they feel that up to one-third of our state's herps may be in trouble, they refrain from recommending any species be listed as T/E without hard data to support their ruling.

Once again I'll remind you that these write-ups are no substitute for attending the meetings. Mike covered all the listed species, supporting his talk with well thought out graphics and excellent photography. He provided a brief natural history of each animal that raised my knowledge of each of the species immensely. He's a pleasure to listen to and his presentations are



Ornate box turtles (*Terrapene ornata*) will be listed as state threatened in 2009. Those of you who have these as pets should apply now for permits to keep them. Absent from numerous historic locations, this habitat specialist is under threat from habitat loss, illegal collecting and pollution.

always fun to watch. And as icing on the cake, we had long discussions over dinner afterwards about why head-starting isn't working and the burn controversy going on in conservation circles. I don't have the talent or the time to convey what you can get from attending. If you don't come, you're missing out.

Mike ended with a plea for us to do what we can to protect our state's herps. He asked us not to buy wild-caught animals, especially the slow reproducing species. Buy only captive-bred, or better yet, adopt through the CHS. Support habitat restoration with your time and money. Donate to nonprofit conservation groups. He named four that he thought deserved your interest: your own society, the CHS; any AZA zoo; the Conservation Fund; and the National Fish and Wildlife Foundation. There are many others. Be aware of conservation issues and don't hesitate to write to your elected officials to let them know where you stand on those issues. Vote! Support your local and federal government conservation organizations. Remember, these animals are not cute and cuddly nor universally loved. Frequently herps are persecuted and denied any right to exist by the ignorant. If you don't support them, who will? Write a check. Now. Just do it. Then write a letter. Then go vote. Heck, this is Illinois. Vote twice.



The percentage of Illinois turtle species listed as being in trouble is higher than similar percentages for other reptile groups. The spotted turtle (*Clemmys guttata*), like many turtles that are threatened in Illinois, has a specialized habitat, small range, and low reproductive capability that make all populations in the state fragile. Illegal collecting for this pretty little turtle is an additional hazard.

Herpetology 2008

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

OLDEST FOSSIL TURTLE

Chun Li et al. [2008, *Nature* 456:497-501] note that the origin of the turtle body plan remains one of the great mysteries of reptile evolution. The anatomy of turtles is highly derived, which renders it difficult to establish the relationships of turtles with other groups of reptiles. The oldest known turtle, *Proganochelys* from the Late Triassic period of Germany, has a fully formed shell and offers no clue as to its origin. This paper describes *Odontochelys semitestacea*, a new 220-million-year-old turtle from China, somewhat older than *Proganochelys*, that documents an intermediate step in the evolution of the shell and associated structures. A ventral plastron is fully developed, but the dorsal carapace consists of neural plates only. The dorsal ribs are expanded, and osteoderms are absent. The new species shows that the plastron evolved before the carapace and that the first step of carapace formation is the ossification of the neural plates coupled with a broadening of the ribs. This corresponds to early embryonic stages of carapace formation in extant turtles, and shows that the turtle shell is not derived from a fusion of osteoderms. Phylogenetic analysis places the new species basal to all known turtles, fossil and extant. The marine deposits that yielded the fossils indicate that this primitive turtle inhabited marginal areas of the sea or river deltas.

RATTLESNAKE PREY PREFERENCES

D. Chiszar et al. [2008, *J. Herpetology* 42(4):764-767] offered choices to 10 prairie rattlesnakes (*Crotalus viridis viridis*) and 10 western diamondback rattlesnakes (*Crotalus atrox*) between envenomated (E) and nonenvenomated (NE) mice. Both species preferred E over NE mice when envenomation was accomplished by a conspecific but not when envenomation was accomplished by the other species. However, when envenomation was accomplished by *Crotalus oreganus oreganus*, E mice were preferred by *C. v. viridis* but not by *C. atrox*. Accordingly, the authors conclude that rattlesnakes of closely related species recognize each other's E prey, whereas rattlesnakes of distantly related species do not.

PARENTAL CARE BY A TREEFROG

J. A. Sheridan and J. F. Ocock [2008, *Copeia* 2008(4):733-736] report a new case of parental care in a *Chiromantis* species from northeast Thailand. This is the first report of parental care in this genus. Observations indicate that *C. hansenae* adults sit on the clutches approximately 72% of the time, both day and night. This clutch attendance may protect eggs from desiccation, parasitic flies, or fungal infection, but the authors were unable to conduct removal experiments to test these hypotheses. In no cases were adults observed actively guarding against known predators such as skinks. This species is unusual among arboreal breeders with parental care in having a high rate of egg attendance, relatively large clutch sizes (235.75 ± 19.78 , $n = 4$), and a short period before hatching (4–6 d).

BODY SIZE AND GROWTH IN BULLSNAKES

J. B. Iverson et al. [2008, *J. Herpetology* 42(3):501-507] studied body size and growth in bullsnares (*Pituophis catenifer sayi*) in the western Nebraska Sandhills from 1987 to 1999. Body size of females was not significantly different from that of males, although the largest individuals were males. Based on eggs hatched in captivity, and size class and recapture data in the field, Nebraska bullsnares hatch at about 33 cm snout–vent length (SVL), grow about 32 cm SVL in their first year, and reach an average adult size of 108 cm SVL. Comparisons of these data with those in the literature suggest that hatchling size, adult size, and juvenile growth rate generally decrease with increasing latitude and longitude; however, these conclusions are limited by the dearth of data from southern populations. Nevertheless, with few exceptions, possibly the result of incomplete sampling, these patterns are also generally reflected across North American *Pituophis* populations.

SUBSTRATE AND SMOOTH SOFTSHELL HATCHLINGS

M. V. Plummer et al. [2008, *J. Herpetology* 42(3):550-554] note that smooth softshell turtles, *Apalone mutica*, prefer medium to large rivers with clean sand where they spend substantial amounts of time buried in the bottom sand substrate; however, the habitat requirements of hatchling *A. mutica* are poorly known. They designed a laboratory experiment to determine whether the presence of an underwater sand substrate affects growth and condition of hatchling *A. mutica*. Hatchlings maintained on a sand substrate grew faster and differed in body appearance compared to hatchlings maintained without a sand substrate. A readily accessible sandy substrate in which to bury may be a significant habitat component for *A. mutica* hatchlings. In addition, investigators maintaining *A. mutica*, and likely other softshell species in the laboratory, should consider the species' substrate requirements in their research design.

BOX TURTLE NESTING ECOLOGY

G. L. Wilson and C. H. Ernst [2008, *The Herpetological Bulletin* (104):22-32] studied the eastern box turtle, *Terrapene carolina carolina*, in an 11-ha woods in Lynchburg, Virginia. There was evidence that moderate to heavy precipitation in June–July induced nesting behavior by gravid females. The authors found that 86–92% of telemetered, gravid females oriented toward open areas (fields, road/trail borders, and yards) to oviposit. Of the observed 13 nestings, 11 (85%) occurred between 17:00 and 01:00 h. Forty-seven percent of eggs hatched in enclosed, predator-proof nest enclosures. Because of migration to and from nesting sites, gravid females had a mean bivariate normal activity range almost five times greater than that of nongravid females. This finding has negative implications regarding the conservation of the species in road-fragmented habitats due to the potential for increased road mortality or other human disturbance of the wider ranging gravid females.

TAIL GLANDS OF THE RED-LEGGED SALAMANDER

W. Largen and S. K. Woodley [2008, *Herpetologica* 64(3): 270-280] note that amphibian skin secretion is a rich source of biological compounds. Histological, morphometrical, functional, and protein biochemical methods were used to understand the role of skin glands in the tail of the red-legged salamander (*Plethodon shermani*), an emerging organismal model for the physiology and evolution of pheromonal communication. Individual granular glands were approximately three times larger in the dorsal tail skin compared to the ventral tail skin. Dorsal tail granular glands emptied when animals were handled to induce release of noxious/sticky substances. Ventral tail granular glands emptied during scent marking. Granular glands in both dorsal and ventral tail skin rapidly enlarged when animals were placed on a clean substrate. Histological study of tail skin identified a subset of ventral granular glands that stained differently from dorsal granular glands. Protein analysis of acetylcholine chloride extracts of dorsal tail skin and ventral tail skin revealed differences in the protein content released by glands in these tail regions. Together, these data suggest that the dorsal granular glands secrete noxious/sticky substances putatively involved in predator defense and the ventral granular glands secrete products possibly involved in scent marking. Future studies will examine behavioral responses to dorsal and ventral tail skin secretions in order to better understand their role in chemical defense and chemosensory communication.

WATERSNAKES ALONG AN URBAN STREAM

A. Pattishall and D. Cundall [2008, *Copeia* 2008(4):752-762] radio-tracked 50 *Nerodia sipedon* living along 2 km of an urban stream in northeastern Pennsylvania over three activity seasons, yielding more than 2520 relocations. Half the stream length is urbanized, flowing through a city park at the head of the study area and an industrial area at the downstream end; the half between is relatively natural, flowing through a conservation corridor. Individual snakes exhibited high site fidelity. For 82% of relocations, snakes were within a 1-m radius of places they had previously occupied, most often using exactly the same hole, rock, branch, or cover object. Snakes were found to have moved to a different site at 27% of relocations. When snakes moved, they returned to previously occupied places 56% of the time. Females exhibited significantly greater site fidelity than males, and snakes occupying the urban half of the study site exhibited significantly greater site fidelity than snakes found in the natural half. Individuals varied greatly in the amount of space they utilized. Snakes had a mean minimum convex polygon (MCP) activity area of 1.13 ha. Snakes appeared to use the stream to travel between locations separated by more than 100 m. Original MCPs overestimated space use by including large terrestrial areas that were never occupied by and were unsuitable to snakes. Fixed kernel methods underestimated space use by producing multiple small, disjunct contours. Both methods often largely or completely excluded the stream. To address these problems, the authors provide additional estimates of space use that sum the MCPs encompassing all of a snake's locations within 100 m of each other and add the area of stream connecting the most upstream and downstream locations.

MOST EXTREME SEXUAL SIZE DIMORPHISM

F. Kraus [2008, *J. Herpetology* 42(4):637-644] synonymizes the ranid frog *Platymantis rhipiphalcus*, from New Britain, with *Platymantis boulengeri*, from the same island. The four mensural characters originally used to separate these frogs covary continuously with body size, and sex is highly correlated with body size, with females much larger than males. Consequently, no features other than size separate these presumptive species, and specimens described as *P. rhipiphalcus* merely represent males and juvenile females of *P. boulengeri*. Males of *P. boulengeri* are here recognized as such for the first time, which leads to the discovery that this species has the most extreme sexual size dimorphism yet reported for any anuran. Female body length averages >3 times that for males, and female body mass averages >40 times that for males. The physical mechanics of reproduction in a species exhibiting such extreme size dimorphism are unknown but will certainly merit future investigation.

GENETIC DIFFERENTIATION IN A LIZARD

J. A. Tennessen and K. R. Zamudio [2008, *Copeia* 2008(3):558-564] used DNA sequences from several mitochondrial regions (*ND2*, *ND4*, and adjacent tRNAs) to examine genetic structure and divergence among populations of the striped plateau lizard, *Sceloporus virgatus*. In the northern portion of this species' range, populations occupy mesic habitats at higher elevations in the mountain ranges of the Madrean Archipelago, and are thus isolated by dry, inhospitable valleys. High genetic differentiation among four of these ranges, and low genetic variation within ranges, imply that gene flow among them has been limited and isolation is ancient, having occurred hundreds of thousands or even millions of years ago. These results conflict with expectations derived from geographical and paleontological data that indicate ecological conditions favoring gene flow occurred as recently as 11,000 years ago.

FRUIT FEEDING IN A CHAMELEON

H. Takahashi [2008, *J. Herpetology* 42(4):760-763] notes that because they possess a highly unique long and projective tongue, chameleons have been viewed as strictly insectivorous and considered to use a specific tongue projection method in every feeding event. He reports behavioral observations on fruit feeding by Oustalet's chameleon, *Furcifer oustaleti*, in the field as the first evidence of spontaneous feeding attempts on plant material by wild chameleons. Also, the author presents results of a feeding experiment to examine differences in feeding on fruits and insects. When chameleons fed on small fruits, most individuals directly picked up them with the mouth at short range, whereas chameleons almost always used tongue projection from a distance to capture small aerial insects. Such alternative feeding tactics occurred within individuals exposed to both foods over a short interval. These results suggest that chameleons discriminate food types to perform the appropriate feeding tactic to efficiently consume different types of food. When chameleons used the direct pickup tactic for fruit in the experiment, the tongue contacted the food item before the jaws did, suggesting that the chameleons have retained lingual prehension, the typical motor pattern of other iguanian lizards.

MOLDY SPECIMENS

C. E. Thacker et al. [2008, Copeia 2008(4):737-741] report that infection by fungal spores and hyphae is an acute problem that may cause damage or loss of specimens in natural history collections. Most ichthyology and herpetology collections are fluid-preserved whole animals, stored in glass jars, but collections frequently also maintain dried specimens of skin or bones, which are vulnerable to fungus. An infection of *Aspergillus* fungus was discovered in the ichthyology and herpetology skeletal collections at the Natural History Museum of Los Angeles County (LACM) in October of 2003. Twelve percent of fish and 4% of herpetological skeletons were visibly infected. The authors elected to use 70% ethanol as a fungicide because it is non-toxic, effective, inexpensive, and produces minimal damage. A total of 688 infected specimens were cleaned, and all 7,987 specimens were rehoused between June 2005 and May 2007. Treatments were carried out by a commercial fungus remediation firm, and the process was monitored by an environmental consultant. Treated specimens were stored in new plastic boxes, housed in one of four ways: sealed bags; sealed bags with desiccant; desiccant only; or no bag or desiccant. Skeletons not visibly contaminated were brushed clean, catalogued, and rehoused in sealed plastic bags and plastic boxes. Periodic agar plate sampling showed no fungal growth in a subset of the four rehousing groups over the course of two years. Among all disinfected specimens, only one displayed a recurrence of fungal growth two years after treatment. The authors recommend treatment of fungus-infested natural history collections with 70% ethanol, and storage in polyethylene boxes and polystyrene or polypropylene bags, to prevent infection and to contain the spread of infection if it does occur.

TERRAIN MODELING AND SNAKE HOME RANGES

D. B. Greenberg and W. J. McClintock [2008, Copeia 2008(4): 801-806] note that studies of snake movement frequently report home range sizes, and these data are key to our understanding of snake ecology. However, despite the fact that many snakes occupy landscapes with topographic relief, snake home range sizes are consistently reported as planimetric (2-dimensional) estimates. The authors investigate the capacity for planimetric area measurements to underestimate snake home range sizes, and explore how this may confound understanding of snake ecology. They use radio-tracking data to estimate home ranges for *Crotalus mitchellii* and *C. ruber* in a topographically-variable landscape, model surface terrain in the estimated home ranges using digital elevation data and widely-available GIS software, and compare planimetric and topographic (3-dimensional) area measurements for these home ranges. The topographic measurements exceeded planimetric ones, on average, by 14% for *C. mitchellii* (8% for females, 19% for males) and 9% for *C. ruber* (10% for females, 8% for males); this suggests that terrain modeling can provide considerably truer estimates of snake home range sizes. The authors discuss how such increased precision might benefit snake ecology research, and also discuss recent papers that might have concluded differently had topographic home range measurements been used. Terrain modeling has become relatively simple with the advent of modern GIS software, and snake ecologists could begin using it routinely.

COQUI POPULATION DENSITIES IN HAWAII

K. H. Beard et al. [2008, J. Herpetology 42(4):626-636] note that the Puerto Rican terrestrial frog (*Eleutherodactylus coqui*) has received considerable attention in Hawaii because of its rapid spread, loud mating calls, and its potential threat to native species. Thus far, its invasion potential on the island of Hawaii remains poorly understood. Critical components for determining this potential are robust estimates of abundance and vital rates across habitat types. To address this lack of information, the authors used mark-recapture methods to estimate *E. coqui* survival and abundance, determine growth rates of adult male and female frogs, and relate densities to elevation, snout-vent length (SVL), habitat structure, and invertebrate abundance. Mean adult *E. coqui* density across eight sites was 62 ± 12 adults/100 m² and ranged from 6 to 138 adults/100 m². Three-year mean adult density estimates were three times greater at three of the study sites (100 adults/100 m²) than the highest long-term estimates from Puerto Rico (33 adults/100 m²). Mean individual growth rates were 0.0078 mm/day (± 0.007 SD, $N = 87$) for males and 0.0097 mm/day (± 0.009 SD, $N = 11$) for females. Frogs of similar size were found to be growing slower in Hawaii than Puerto Rico. No relationships were found between elevation and *E. coqui* density or elevation and SVL or between invertebrate abundance and *E. coqui* density. However, there was a positive relationship between understory structure and *E. coqui* density. This relationship suggests that removing understory structure could reduce *E. coqui* densities, although other potential implications of this management treatment should be considered.

ROLE OF MICROHABITATS IN DESICCATION

T. A. G. Rittenhouse et al. [2008, Copeia 2008(4):807-814] report that juvenile survival is an important life history feature, because recent modeling efforts suggest that modest changes in juvenile survival rates due to habitat change may greatly affect population growth rates. The authors compared water loss and survival rates of recently metamorphosed American toad (*Anaxyrus americanus*), green frog (*Lithobates clamitans*), and wood frog (*Lithobates sylvaticus*) juveniles contained within four microhabitats, two of which occur in uncut control forest (i.e., forest ridgetop, forest drainage) and two within recently harvested forest (i.e., clearcut open, clearcut brushpile). Survival was higher in forest drainage than forest ridgetop, indicating that microhabitats within continuous forest are not equally suitable. Brushpiles of coarse woody debris reduced desiccation risks in clearcuts as indicated by survival differences between clearcut open and clearcut brushpile and survival in clearcut open was very low for all species in both years. The authors found species differences in survival as well as a species by microhabitat interaction in water loss rates. These results are best explained by observed behavioral differences as opposed to physiological differences among species. The authors conclude that desiccation can be a major source of mortality for juveniles entering terrestrial habitats, especially habitat altered by anthropogenic land-use. Desiccation risks are greatest in areas with low soil moisture conditions, which for this study included microhabitats within clearcuts without coarse woody debris, forested ridgetops, and years with below average rainfall.

Unofficial Minutes of the CHS Board Meeting, November 14, 2008

The meeting was called to order at 7:40 P.M. at the Schaumburg Public Library. Board members Deb Krohn, Matt O'Connor and Cindy Rampacek were absent.

Officers' Reports

Recording Secretary: Minutes of the October 17 board meeting were read. Minor corrections were made and the minutes were accepted.

Treasurer: Andy Malawy presented the October financial reports and no questions were raised.

Membership Secretary: Current membership is 545.

Vice-president: Jason Hood asked for ideas for local speakers for the January and February meetings. We need to get food for the Christmas meeting. Jenny moved to allocate \$100 for the purchase of food. The motion passed unanimously.

Sergeant-at-arms: The attendance at the October general meeting was 48. Average attendance this year has been 52.

Committee Reports

Shows:

- Great Lakes Pet Expo, Saturday, January 31.
- Reptile Rampage, March 8.
- Chicagoland Family Pet Expo, Arlington Racetrack, March 20–22.
- Notebaert Nature Museum, first weekend of each month.

Raffle: Josh has lots of items.

Adoptions: Linda has several animals needing homes, heavy on turtles. Bob Bavirsha gave the treasurer a \$195 check for alligator exam and blood panel. The money came from penalties assessed against a person who dumped an alligator in the Kishwaukee River.

Old Business

Symposium 2009: Jason needs ideas for making the symposium run well. Options discussed—Paypal account, mobile credit card machine, early registration possibilities, pricing.

Rules for Live Animal Exhibitors: Voting on the rules was deferred until December.

Nominating Committee: Thanks to Rich Crowley for printing

and mailing the absentee ballots.

New Business

Links on Website: Should we have links to other websites on the CHS site? Other sites should be screened or evaluated, reasons given for likes or dislikes. Send info to the CHS Forum so the list can be compiled for the website.

'Fest ads in the *Tribune*: 20% of those surveyed got 'Fest info from the *Tribune*, but their circulation is dropping. Ad cost is \$3000. Should we continue? How can we get lower rates from the *Tribune*? Any ideas for 'Fest advertising should be sent to John Archer.

Security: Other herp societies have had recent treasurer issues regarding stolen money. Can we protect ourselves? Options—bonding, second board member checking on account activity. Linda will ask other societies if they have systems in place to prevent future problems. Do we need measures to keep better track of money and inventory from sales at shows, raffles, etc. Rick Hoppenrath will work with Miller Ray to implement a system of tracking inventory.

Herp of the Month: Should we start this again? Will it bring in more people? It was stopped due to lack of participation. Options—use the forum to determine animal of the month, mass emails to members promoting this and other events. John will work with Aaron LaForge and Chris Lechowicz on mass emails.

Round Table

Mike Dloogatch mentioned a paper that appeared earlier this year in the *Biological Journal of the Linnean Society* assigning reticulated and Timor pythons to a new genus, *Broghammerus*. This generic name was first used by Raymond Hoser in 2004.

Aaron LaForge is hoping to get his computer fixed soon!

Bob Bavirsha needs email addresses again since he has a new computer. A pet store called him with a gopher tortoise someone dropped off. DNR will pick it up.

Linda asked if December's board meeting would be a party or just a regular meeting.

The meeting adjourned at 9:32 P.M.

Respectfully submitted by Jenny Vollman for Cindy Rampacek



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RATS AND MICE

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Advertisements

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. We feed our colony a nutritionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice starting from: pinks, \$.17 each; fuzzies, \$.24 each; hoppers, \$.30 each; weanling, \$.42; adult, \$.48. Rats: starting with pinks at \$.45 each, to XL at \$1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. PO Box 85, Alpine TX 79831. Call **toll-free** at (800) 720-0076 or visit our website: <http://www.themousefactory.com>.

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For sale: Rats—live or frozen. I breed rats for my collection of boas so only top quality lab chow and care will do, I'm now offering surplus animals for sale. Located in far south suburbs of Chicago. Only orders of 20 or more please, no large rats will be available. For current availability and prices, please e-mail Steve at smuys@sbcglobal.net.

For sale: books. Australian Wildlife Series—*Australian Snakes and Lizards*, 1981, 51 pp., many good color photos, covers all 5 of Australia's lizard families plus snakes, including the taipan and death adder, \$22; *Australian Reptiles & Frogs* by Raymond T. Hoser, 1989, 238 large (8½ × 11½") pp., 631 color photos of herps and their habitats, life history info, range maps, bibliography, info on captive husbandry, conservation, reptile photography, DJ, \$135; *Australia's Reptiles—A Photographic Reference to the Terrestrial Reptiles of Australia* by Stephen K. Wilson and David G. Knowles, 1988; 447 large (8 × 11½") pp., 847 color photos, drawings, range maps; descriptions, taxonomy, habitats, habits, extensive bibliography, text based on field work by authors throughout Australia, DJ, \$130; *Animals of Eastern Australia - A Photographic Account of the Mammals, Reptiles and Amphibia* by Stan & Kay Breeden, 1967, 128 pp., 197 b&w and 24 color photos, essentially an album of fine photos, half of the book is herps, DJ, \$40. All books hardbound and in excellent condition. \$3 postage and handling for orders under \$25, free for orders of \$25 or more. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com

For sale: Well started 2008 C.H. Sri Lankan stars, leopard tortoises and pancake tortoises. All captive-hatched by us and eating great. Stars are \$450 each, with temperature-sexed pairs from unrelated females available. Leopards are \$125 each and pancakes are \$350. Contact Jim or Kirsten Kranz at 262-654-6303 or e-mail KKranz1@wi.rr.com.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

For sale: Well started spider morph ball pythons (*Python regius*) available for free delivery in the Chicagoland area—males, \$350. Also available are high-contrast, Sarawak locality and Walnut × Sarawak pairing Borneo pythons (*Python breitensteini*). Pricing is based on male sex with \$50 more for females, if available: 2007 high-contrast, \$150; 2007 Sarawak, \$175; 2006 Sarawak, \$200, 2007 Walnut × Sarawak (melanistic Borneos), \$125. All feeding on frozen thawed adult mice and/or rats. Shipping available as an additional cost, if needed. Details and helpful info on my website at www.richcrowleyreptiles.com Contact Rich Crowley at 708-646-4058 or email pogona31@yahoo.com.

Free to any interested party: Back issues of CHS Bulletin from Oct 1987 to the present. I live in the Chicago area and can bring them to the monthly meeting. John Christianson, jnlchristianson@comcast.net

Herp tours: **Madagascar—Tortoise Tour & Chameleon Tour** seeking adventurous members for January–February 2009. The goal of the tortoise tour, to be co-led by **Peter Pritchard** of the Chelonian Research Institute and **Bill Love**, will be to see all native species in the wild and record various aspects of their lives photographically. The later chameleon tour, co-led by **Mike Monge** of FL Chams and **Bill Love**, will focus on panther chameleons, trying to find and photograph as many of the color morphs as possible in the wild. Details are at Blue Chameleon Ventures' site at: www.bluechameleon.org.

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Snake sitting or boarding: Mild-mannered adult female reticulated python, 18 feet, needs you from May to fall 2009. We are searching a responsible person either to housesit with her in northern Michigan or care for her at your home (non-Illinois only). Must be willing to feed her rabbits and shed her. Attractive, flexible terms. For more details, contact Kathy Bricker, 231-627-4830 or kathyhomeaccount@hotmail.com

Line ads in this publication are run free for CHS members—\$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

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UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., **Tuesday, December 30**, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **This meeting will be a holiday party.** The CHS will provide soft drinks and snacks. If you would like to bring something edible to share with the group, you are invited to do so. If you would like to bring an animal to show off to the group, you are encouraged to do that as well. This will be a chance to socialize all evening and get to know your fellow members a little better.

The first meeting of the new year will be on January 28. The speaker has not been confirmed as of this writing, so watch for a posting on www.chicagoherp.org.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., January 16, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: <http://www.geocities.com/~chicagoturtle>.

ELECTION RESULTS

As a result of the elections held November 26, 2008, the following officers and members-at-large will serve on the CHS Board of Directors for the year 2009.

President: John Archer
Vice-president: Jason Hood
Treasurer: Andy Malawy
Recording Secretary: Cindy Rampacek
Corresponding Secretary: Deb Krohn
Publications Secretary: Aaron LaForge

Membership Secretary: Mike Dloogatch
Sergeant-at-arms: Dan Bavirsha
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Linda Malawy
Brad Trost
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